AMENDMENTS TO THE CLAIMS

The following claim listing represents the claims as pending in the current application.

1-5. **(Cancelled)**

6. **(New)** A method of stabilising an electrolysis cell with a boundary, a liquid metal layer and an electrolyte layer having specific operational and geometric parameters, and comprising the steps of:

determining amplitude and frequency values for a desired external, time-varying and/or alternating magnetic field through wave reflection analysis on a theoretical wall whose parameters are representative of the cell wall's parameters; and

imposing on said cell an external, time-varying and/or alternating magnetic field having substantially the same amplitude and frequency values determined in the wave reflection analysis so that the resultant magnetic field imposed on the cell tends to parametrically and dynamically desynchronize any occurring resonance instability near the cell's walls; the energy consumed for said additional magnetic field being less than the energy consumed for the operation of said cell.

7. **(New)** A method according to claim 6, wherein the imposed magnetic field is of the form $b = 1 + b_0(x,y) \cos(\omega_0 + \theta_0)$,

where

b_0 is the normalized amplitude,

ω_0 is the frequency

θ_0 is the initial phase of the controlling external magnetic field which is to be obtained.

8. **(New)** A method according to claim 6, comprising the step of solving the following equations to derive the imposed magnetic field:

$$\frac{\delta^2\eta}{\delta t^2} - c^2\nabla^2\eta = c^2\nabla\phi\cdot\left[\nabla\times b(x,y,t)e_x\right] - v_1\frac{\delta\eta}{\delta t},$$

$\nabla^2\phi = -\beta\eta$, and

$$\frac{\delta\phi}{\delta n} = 0,\ \frac{\delta\eta}{\delta n} = -b(x,y,t)\frac{\delta\phi}{\delta\tau} \text{ at } \Gamma.$$

9. **(New)** A method according to claim 6, comprising the step of deriving said magnetic field through the analysis of reflection on a theoretical infinite wall.

10. **(New)** A method according to claim 6, comprising the step of applying said magnetic field at said cell boundary.

11. **(New)** An electrolysis cell system for a cell with a boundary, a liquid metal and an electrolyte, having specific operational and geometric parameters, and comprising:

means for imposing on said cell an external, time-varying and/or alternating magnetic field;

means for determining amplitude and frequency values of the magnetic field through wave reflection analysis on a theoretical wall whose parameters are sufficiently representative of said cell wall's parameters; and

means for applying said magnetic field essentially at the cell boundary; whereby said magnetic field tends to parametrically and dynamically de-synchronize resonance instability near said cell's walls.

12. **(New)** A system according to claim 11, comprising means for deriving a magnetic field through the analysis of reflection on a theoretical infinite wall.

13. **(New)** A system according to claim 11, comprising means for carrying out analysis on a rectangular cell wall and means for adapting the analysis to suit other geometries.

14. **(New)** A system according to claim 11, comprising means for applying said analysis essentially only to one section of the cell.

15. **(New)** A system according to claim 11, comprising a single ring encircling the cell which applies a field which is essentially vertical.

16. **(New)** A system according to claim 11, comprising means for applying a magnetic field of the form $b = 1 + b_0(x,y) \cos(\omega_0 + \theta_0)$,

where

b_0 is the normalized amplitude,

ω_0 is the frequency, and

θ_0 is the initial phase of the controlling external magnetic field which is to be obtained.